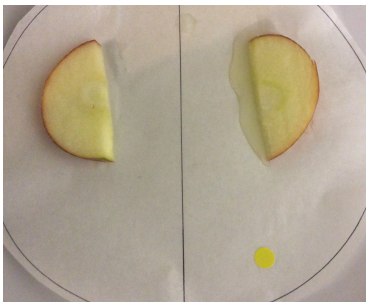
Mary Rose Richardson

Oxidising apples

What you need

An apple
A lemon cut in half
Lemon squeezer
Pipettes
Apple corer
Paper plates with line
Yellow stickers
Printed explanation



1. Introduce experiment in an enticing manner. Link it to any previous learning or experiences.

Give the children the apple to feel. Describe it. Is it solid, liquid or gas? Do the same with the lemon. Squeeze the lemon into a dish. Look at and describe the lemon juice. Is it solid, liquid or gas? Let the children taste it. Ask children to take a deep breath in and out. Then waft air in front of your face with your hand. Describe air and how it feels. Is it solid, liquid or gas?

"We are going to cut the apple and leave one piece on its own, and another piece with lemon juice on it to see what happens when the cut apple is (exposed to air) left out in the air.

Hmm, I wonder what might happen. What do you think?"

2. Give each child a paper plate which has a line drawn down the middle. Explain that this is for their experiment and they can take it home. Write their name on it and ask them to stick a yellow sticker on one side.

3. Look at and feel the lemon. Squeeze out the juice. Talk about it/taste it. Put aside for later.

4. Use the apple corer to cut the apple into equal pieces. An able child can do this on their own or with support. Count the pieces.

5. Using your own plate, take 2 pieces of apple. Put one on one side of the plate, and one on the other. Make sure children have seen.

6. Using a pipette drop lemon juice on to the piece of apple on the side of the plate that has the yellow sticker on.

7. Let the children take turns to set up their experiment plates as you did. Only help if really necessary.

8. Now round up what you did and observe what happens to the apples.

9. The effects may take a while so children can continue their work cycle and come back to observe what has happened later in the session.

10. The child can take their experiment home as a link for parents/carers

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What happens?

The apple without lemon juice on turns brown whilst the slice with lemon juice on remains the same.

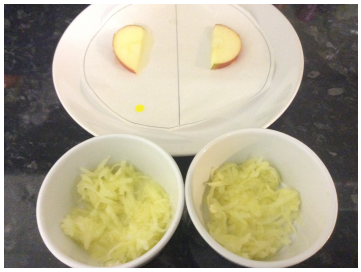
Why did it happen?

Like all animals and plants, the apple is made of lots and lots of cells. When the fruit is cut, its cells are damaged and a special substance (enzyme) is released to help 'heal' the plant. When this substance is exposed to the oxygen in the air it turns brown.

Lemon juice contains vitamin C and citric acid. Both of these are antioxidants which stop the browning process. The lemon juice has more of the special 'healing' substance than the apple has.

What next?

Follow any lines of enquiry that the children come up with.



Does grating the apple make a difference?
Do different types of apple oxidise at different rates?
Do any other fruit or vegetables react in the same way when left in air? Try avocado, celeriac, pear and potato.

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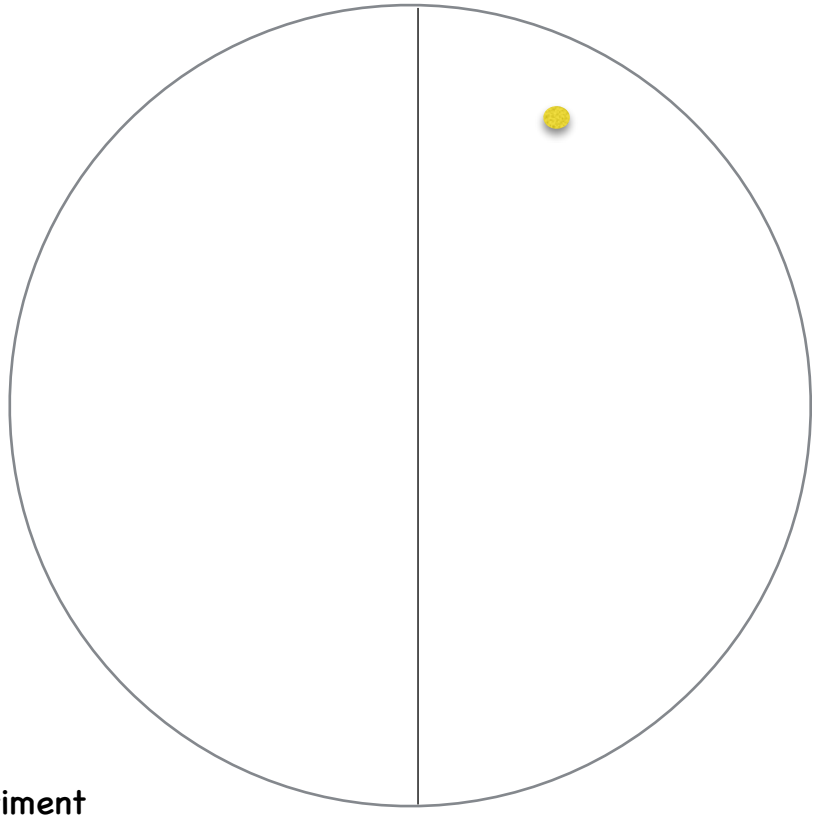

My apple experiment

We put one slice of apple on one side of the plate on its own, and one slice of apple on the other side of the plate with lemon juice on. We observed what happened.

Mary Rose Richardson

Red cabbage indicator paper
Acid or alkaline

What you need

Red cabbage
Water
Pan
Sieve
Glass bowl
Blotting paper (cut into strips)
2 plastic cups
Vinegar (or lemon juice)
Bicarbonate of soda

Prepare red cabbage dye and indicator strips prior to experiment.

1. Introduce experiment in an enticing manner. Link it to any previous learning or experiences.

"We are going to make special paper. It is called indicator paper because it will indicate or tell us if something is acid or alkaline by changing colour..."

2. Show children the red cabbage. Explore it and name it. Talk about the colour. Explain how we are going to use the colour to make the indicator paper. The red cabbage colour will dye the paper.

3. Cut the cabbage in front of the children. Look at the patterns. Give each child a wedge of red cabbage and ask them to tear it in to pieces and put it in the pan. Let them taste it if they like. Look at your hands, what do you notice?

4. Bring out the cooled cabbage that was cooked earlier. Strain the cabbage through a sieve into a glass bowl. Observe the liquid and discuss.

5. Demonstrate how to drop a strip of indicator paper into the liquid. Let it soak up the liquid then take it out with tongs, shake off excess water and lay it on a tray. Let each child do this. Put them to one side to dry for children to take home later.

6. Show children the dried indicator paper that you prepared earlier. Explain how we can use the indicator to tell us if a substance is an acid or an alkaline.

7. Name the vinegar and open a discussion about it, what is it used for?. Support child to pour some vinegar into a cup. Children could smell and taste it.

8. Name the bicarbonate of soda, open a discussion about it, what is it used for? Child can spoon one teaspoonful of powder into a cup, add a little water and stir until dissolved.

9. Children can dip one end of their indicator paper in to vinegar, then the other end into the bicarbonate solution. Wait and observe what happens.

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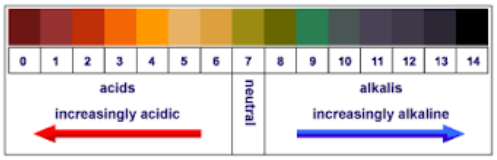
What happens?

When you dip the indicator paper into the vinegar, it will turn pink or red.
When you dip the indicator paper into the bicarbonate of soda solution it turns green.
Vinegar is and acid, and bicarbonate of soda is an alkaline

Why did it happen?

Red cabbage juice contains a natural pH indicator that changes colours depending on the acidity of the solution. The pigment in red cabbage that causes the red colour change is called flavin (an anthocyanin). Flavin is a water-soluble pigment also found in apple skins, plums and grapes.



What next?

Follow any lines of enquiry that the children come up with.
What happens if you dip in water?
What about if you mix the vinegar and bicarbonate of soda together?
What other acids or alkaline can you find?

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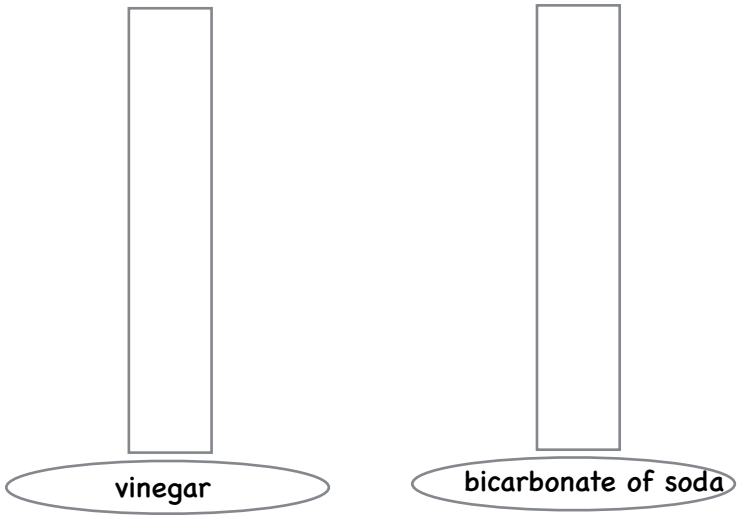

My indicator paper experiment

We made indicator paper out of red cabbage juice. We dipped one end of the indicator paper in to vinegar and one end in to bicarbonate of soda dissolved in water. We observed what happened.

Mary Rose Richardson

Hot and cold milk molecules

What you need

2 transparent cups
Milk
Measuring jug
Microwave/ pan & hob
Food colouring
Marker pen
Pipette

1. Introduce experiment in an enticing manner. Link it to any previous learning or experiences.

"We are going to see what happens when we add colouring to hot and cold milk.."

2. Measure 200ml of cold milk and pour into a cup. Notice how it reaches the line marked on the cup

3. Measure same amount of milk and heat for 30 seconds (or until piping hot) either in the microwave or in a pan. Pour the hot milk into the other cup. Notice how it reaches the mark. Can you see it steaming?

4. With caution, let the children touch the side of each cup and describe the temperature.

5. Because it is a 'controlled experiment' ask 2 children (or 1 child and yourself) to drop 5-8 drops of food colouring into each cup at exactly the same time.

6. Sit back and observe what happens.

What happens?
The hot milk begins to turn blue as the food colouring moves and spreads quickly.

Why did it happen?

Everything around us is made of molecules. The molecules in milk are in a liquid state and are moving around each other in chains.
When the milk is heated, the molecules gain lots of energy and move around more. Therefore the molecules in the hot milk are moving the food colouring around causing it to spread or **diffuse** more quickly.

Analogy
Imagine that you are painting a picture. It is raining. You want to cover it all with paint. When you are tired and cold you move slowly to put marks on the paper, but then the sun comes out, you eat a banana which gives you lots of energy and then you move really quickly. The paper gets covered in paint faster than when you were moving slowly.

What next?

Follow children's lines of enquiry.

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Do the molecule dance!!! You can even do it with paint on a paper covered floor to act out the analogy.

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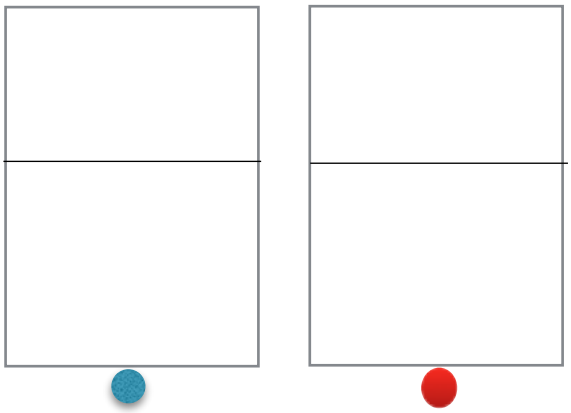


My hot and cold milk experiment

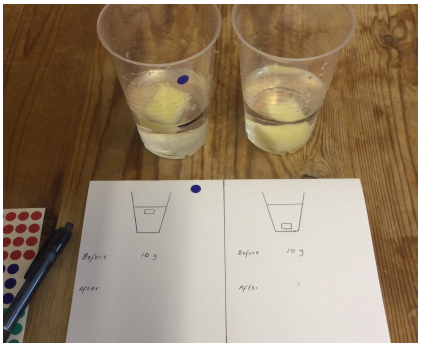
We dropped 5 drops of food colouring into some cold milk and some hot milk at the same time. We left it and observed what happened.

Mary Rose Richardson

Osmotic potatoes

What you need

- Transparent cups
- Stickers
- Water
- Measuring jug
- Salt
- Teaspoon
- Potato
- Peeler
- Knife
- Digital scales or ruler



1. Introduce experiment in an enticing manner. Link it to any previous learning or experiences.

"We are going to see what happens when we put one piece of potato in plain water and one piece of potato in salt water."

2. Measure 200ml of water and pour into one of the cups.

3. Do the same for the other cup. Spoon in 2 teaspoons of salt and stir until dissolved (this in itself is fascinating). Put a sticker on this cup.

4. Peel the potato. Pass the peeled potato round and feel it. Is it dry or wet? Inform children that water makes up most plants and animals. It is really important for us to drink water to stay healthy.

5. Cut the potato in to equal sized portions. Use a ruler to be accurate. If you have digital scales, weigh each piece of potato. Try to make them identical eg. 10g each.

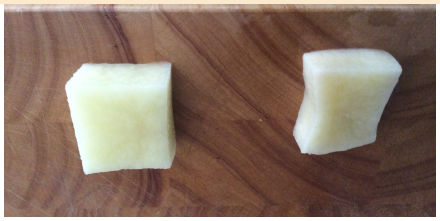
6. Drop one potato portion into the plain water and the other into the salt water at exactly the same time.

7. Round up what has been done and ask children to hypothesise upon what may happen.

8. The effects will take a while, so either let the children continue their work cycle and come back to it later, or the next day OR bring out an experiment you did earlier explaining how long it took to get those results.

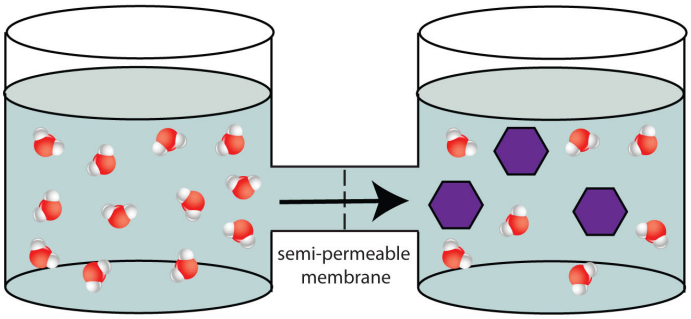
What happens?

The portion of potato in the plain water remains hard (turgid)
while the portion in the salt water shrinks. It becomes squashy (flaccid).



Why did it happen?

Water molecules always travel from a low solute concentration to a high solute concentration. This is called **osmosis.** Like all plants and animals, the potato is made of cells. Each cell has a wall called a **membrane.** The walls of the cell let water molecules pass in and out, it is called a semi-**permeable membrane.** So, the water from inside the potato traveled out of the potato and into the salt water.



Analogy Imagine the salt molecules are so strong and are bullying the water molecules, therefore the water molecules from the potato need to go and help.

What next?

Follow children's lines of enquiry.
What happens if you now swap the potatoes over?
Does the same thing happen with sugar?

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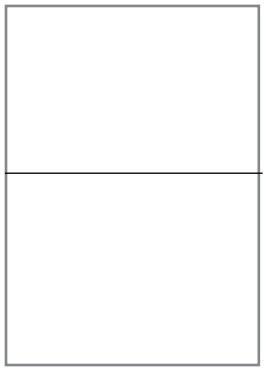
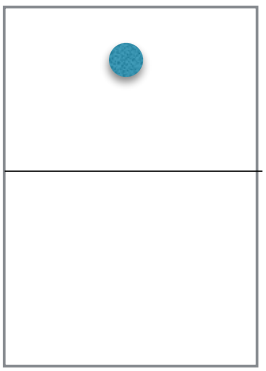


before.....

after.....



before.....

after.....

My osmosis potato experiment

We cut potato in to exactly the same sized portions. We put one bit in plain water and one in salty water. We observed what happened.

Mary Rose Richardson

Paper flowers

What you need

Coloured paper
The same coloured card
Scissors
Pen
A shallow bowl or tray
Water
Jug

Prep.
Cut the paper and card into squares 15cm/15cm

Fold into quarters.

Draw a petal shape onto folded square and cut out (make sure you don't cut the folded side)

Make sure you have enough for yourself and each child

1. Introduce experiment in an enticing manner. Link it to any previous learning or experiences.

"We are going to make some flowers out of different kinds of paper and see what happens when we float them on water."

2. Feel and describe the different kinds of paper and card. Which is thickest/ thinnest. Does one bend more easily?...

3. Give each child a paper petal. Demonstrate how to carefully unfold it and ask the children to do the same (remember economy of movement). Then demonstrate how to fold each petal inwards to meet in the middle of the flower.

4. Repeat with the card petal. Each child should have one folded paper flower and one folded card flower.

5. "Now we can see what happens when we put our flowers in the water... What do you think might happen? Will they float or sink?..."
Take some time to hypothesise and listen to the children's suggestions

6. Ask a child to collect some water in the jug and pour into the tray/bowl. With excitement and silence put the first paper flower into the water tray and observe. What happened? Remove the flower from the water.

7. Repeat with the card flower. What happened? Remove the flower from the water.

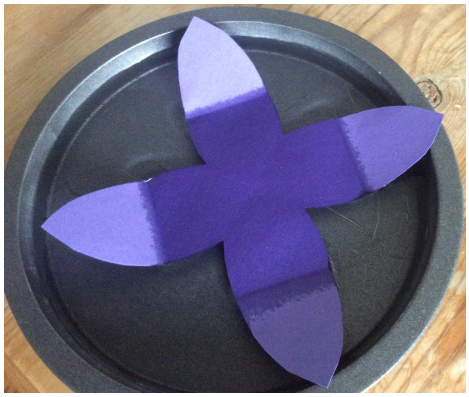
8. Discuss what happened. Which flower opened the fastest? Ponder upon why?

9. Let each child take turns to experiment with their own flowers. Do they get the same results?

10. Discuss the conclusions.

What happens?

When the flower meets the water it opens. It turns a darker colour.
The paper flower opens more quickly than the card flower.



Why does it happen?

The paper and card are made from fibres. These fibres absorb (suck up) water. This causes the fibres to move, so the water pushes the fibres on the folded paper causing it to open.
The paper absorbed the water quicker than the card because it is thinner. That is why the paper flower opened faster than the card

flower.

What next?

Follow any lines of enquiry.
Does the colour of the paper make a difference?
Try using lots of different kinds of paper and card.
What happens if you cover the flower in wax crayon?
What about using white paper with food colouring in the water?
Let the children make different sized and shaped flowers.

name:..... date:.....

Staple or glue small paper flower here

Staple or glue small card flower here

My paper flower experiment

We put a folded paper flower on to water and observed what happened. We did the same with a folded card flower.

Mary Rose Richardson

Successful early years science

Top tips

. Many scientific discoveries are accidents, when things didn't go according to plan. If things don't work out as you expected, don't worry, use it as a learning experience. Include children in discussing what may have affected the results...

. Pitch the experiment at the right level for the children. An explanation is not necessary unless the children ask. The experimental process and observing change is enough.

. Every hypothesis (no matter how ridiculous) should be accepted and discussed.

. Act as if it is the first time you have ever seen the occurrence. Demonstrate awe and wonder.

. If the child asks you something you don't know, find the answer out together.

. A positive learning experience is more important than any knowledge learned.

. Always make it fun. Include lots of movement and singing.

. 'Follow the child'

. Children LOVE repetition. Repeat the experiments again and again giving the children more freedom each time.

. Always follow up and remind children of what they have done. Record the experiments some how and look back at them. The child could have an 'experiment book' with photos and drawings in.

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